

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TSVI GOLDENBERG

Appeal No. 96-2043
Application 07/990,514¹

ON BRIEF

Before ABRAMS, STAAB, and GONZALES, Administrative Patent Judges.

GONZALES, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final

¹Application for patent filed December 15, 1992. According to appellant, this application is a continuation-in-part of application 07/593,485, filed October 3, 1990, now U.S. Patent 5,188,632, issued February 23, 1993 which is a continuation of application 07/218,907, filed July 14, 1988, now abandoned.

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rejection of claims 1 through 9, which are all of the claims pending in this application.

We REVERSE.

BACKGROUND

The appellant's invention relates to a laser angioplasty system comprising, inter alia, a plurality of fiber-optic waveguides made of synthetic silica and a pulsed XeCl Excimer laser wherein the pulse duration is in the range of 100-3000 nsec. Appellant's specification teaches that fiber-optic waveguides are more easily damaged by high power density than by high energy density. Appellant's system seeks to reduce the peak power density at the input ends of the fiber-optic waveguides while maintaining a high energy level to produce efficient ablation of tissue by lengthening the pulse duration (specification, pages 17 and 18). An understanding of the invention can be derived from a reading of exemplary claim 1 which appears in the appendix to appellant's brief.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Kaufman et al. (Kaufman) 27, 1967	3,327,712	Jun.
Guerder et al. (Guerder)	4,221,825	Sep.

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09, 1980		
Seppala et al. (Seppala)	4,345,212	Aug.
17, 1982		
Hussein et al. (Hussein)	4,445,892	May
01, 1984		
L'Esperance, Jr. (L'Esperance)	4,664,913	May 19,
1987		
Davies	4,672,961	Jun. 16,
1987		

The following rejections are before us for review:

(1) Claims 1 and 3 through 7 stand rejected under 35 U.S.C. § 103 as being unpatentable over Hussein in view of L'Esperance, Guerder, Davies and Seppala.

(2) Claims 2, 8 and 9 stand rejected under 35 U.S.C. § 103 as being unpatentable over Hussein, L'Esperance, Guerder, Davies and Seppala, as applied to claim 1, and further in view of Kaufman.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellant regarding the above-noted rejections, we make reference to the examiner's answer (Paper No. 16, mailed August 22, 1995) for the examiner's complete reasoning in support of the rejections, and to the appellant's

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brief (Paper No. 15, filed April 17, 1995) for the appellant's arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellant's specification and claims, to the applied prior art references, and to the

respective positions articulated by the appellant and the examiner. Upon evaluation of all the evidence before us, it is

our conclusion that the evidence adduced by the examiner is insufficient to establish a case of obviousness with respect to claims 1 through 9. Accordingly, we will not sustain the examiner's rejections of claims 1 through 9 under 35 U.S.C.

§ 103. Our reasoning for this determination follows.

In rejecting claims under 35 U.S.C. § 103, the examiner bears the initial burden of presenting a prima facie case of obviousness. See In re Rijckaert, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993). A prima facie case of

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obviousness is established by presenting evidence that the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the references before him to make the proposed combination or other modification. See In re Lintner, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972). Furthermore, the conclusion that the claimed subject matter is prima facie obvious must be supported by evidence, as shown by some objective teaching in the prior art or by knowledge generally available to

one of ordinary skill in the art that would have led that individual to combine the relevant teachings of the references to arrive at the claimed invention. See In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Rejections based on

§ 103 must rest on a factual basis with these facts being interpreted without hindsight reconstruction of the invention from the prior art. The examiner may not, because of doubt that the invention is patentable, resort to speculation,

unfounded assumption or hindsight reconstruction to supply deficiencies in the factual basis for the rejection. See In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968). Our reviewing court has repeatedly cautioned against employing hindsight by using the appellant's disclosure as a blueprint to reconstruct the claimed invention from the isolated teachings of the prior art. See, e.g., Grain Processing Corp. v. American Maize-Products Co., 840 F.2d 902, 907, 5 USPQ2d 1788, 1792 (Fed. Cir. 1988).

With this as background, we turn to the rejections of the claims on appeal.

a. Claims 1 and 3-7

Claim 1 calls for an angioplasty system including an elongated catheter having proximal and distal ends and a longitudinal lumen open to the distal end for receiving a guidewire, a plurality of fiber-optic waveguides contained in

the catheter and extending to the distal end of the catheter for emitting energy conducted therethrough in a direction generally forwardly of the distal end of the catheter with each waveguide having an energy conducting core made of synthetic silica that is substantially free of metallic impurities, and a pulsed XeCl Excimer laser having an output wavelength of about 308 nm, with each pulse having a duration between 100 nsec and 3000 nsec and being coupled into the proximal end of the waveguides at a density of at least 50 mJ/mm².

The examiner describes Hussein as teaching a catheter device having a guidewire lumen, a laser and a plurality of optical fibers. L'Esperance is described as teaching a pulsed XeCl Excimer laser for ablating tissue without charring. Guerder is described as teaching substantially pure synthetic silica to make optical fibers. Davies is described as teaching a pulsed Excimer laser having a wavelength and density as called for in claim 1.

Seppala is described as teaching certain advantages for using

laser pulses of "about 200 nanoseconds" and a technique for producing such pulses. It is the examiner's position that it would have been obvious to a person of ordinary skill in the art at the time of appellant's invention to employ an XeCl Excimer laser operating at a wavelength of about 308 nm and density of at least 50 mJ/mm² as suggested by L'Esperance and Davies, a fiber-optic waveguide as taught by Guerder, and a pulse stacking technique as taught by Seppala to produce pulses of greater than 200 nsec in the angioplasty device taught by Hussein. See, Answer, pages 2 and 3.

The appellant attacks the rejection on the basis that none of the applied references teach the combination of features set forth in the claims (Brief, pages 5-8). In addition, appellant argues that the examiner's rejections are based on impermissible hindsight (Brief, pages 9-11).

Our review of Seppala reveals that Seppala teaches a method and apparatus for the production of a high power laser beam of short, controllable temporal duration while avoiding optical damage to any of the optical elements of the laser system (col. 1, lines 39-46). The method disclosed by Seppala comprises the

steps of replicating a laser beam of temporal duration J as an array of N such beams; time shifting the N beams relative to one another and stacking the beams end-to-end so as to form a continuous composite beam of temporal duration $t = N \cdot J$; passing the continuous composite beam one or more times through an optical amplification medium; physically separating the composite beam into N amplified beam replicas; and time shifting the replica beams so as to bring all beams into temporal coincidence in a spatially contiguous array for subsequent use.

One example of the apparatus disclosed by Seppala to perform the method is shown in Figs. 3 and 4. A short pulse from a laser is injected onto an array of partially transparent reflectors 19-1, 19-2, . . . , 19-16, and divided into 16 equal intensity pulses, 21-1, 21-2, . . . , 21-16. These pulses are then sequenced in time by reflection from another set of reflectors 23-1, 23-2, . . . , 23-16. For example, if the pulse length of the injected signal is 20 nsec, then after beam splitting, delay, and "recombination" (as in FIG. 2), the effective pulse length will be 16 times

larger, or 320 nsec. This latter set of mirrors is arranged so as to optically delay

each of the 16 beams by time intervals $t_r = rJ$ ($r=0, 1, \dots, 15$) so that these beams arrive at a common beam expander (convex reflector) 25 in serial order, forming a temporally continuous pulse (see FIG. 2) of time duration $t=16J$. 320 nsec. The temporally sequenced pulses are reflected from the convex reflector 25 and expanded to fill the aperture of an amplifier 27. After passage once through the amplifier, each pulse encounters a large concave reflector 29 that returns the pulse through the amplifier for further amplification, and directs it to a second convex reflector 31. The reflector 31 recollimates and directs each beam to an array 33 of plane 100% reflectors, positioned in such a way that, after reflection from this array, the beams are parallel to each other, and all the pulses are temporally coincident. The final pulse length is again 20 nsec. See col. 3, line 50-col.

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4, line 8.

In short, Seppala teaches forming a composite pulse having a temporal time duration $t = N_B \cdot 320 \text{ nsec}$ as an intermediate step in the process of forming a high power laser beam output. The duration of the output beam, however, is 20 nsec. As appellant points out at page 8 of the brief, Seppala suggests that the invention may be useful in inertial confinement fusion.

We have carefully considered the collective teachings of Hussein, L'Esperance, Guerder, Davies and Seppala. However, we fail to perceive any suggestion in the collective teachings of the references to couple a pulsed XeCl Excimer laser having a pulse duration between 100 nsec and 3000 nsec to the proximal end of a fiber optic waveguide in an angioplasty system which would have motivated one of ordinary skill to make such a change in the catheter device shown by Hussein, except the hindsight accorded one who first viewed the appellant's disclosure. This, of course, is impermissible. See In re

Fritch, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992). Accordingly, we will not sustain the rejection of claim 1 under 35 U.S.C. § 103 as being unpatentable over Hussein in view of L'Esperance, Guerder, Davies and Seppala.

Claims 3 through 7 are dependent on claim 1 and, therefore, contain all of the limitations of claim 1. Accordingly, the examiner's respective rejections of claims 3 through 7 under 35 U.S.C. § 103 will not be sustained.

b. Claims 2, 8 and 9

Independent claim 8 contains all of the limitations of claim 1 previously discussed and, in addition, further defines the

plurality of fiber-optic waveguides as being disposed around the guidewire lumen in the elongated catheter. Further, each waveguide is recited as having a glass material cladding surrounding the core and a diameter no greater than 200 microns.

In the rejection of claim 8, the examiner applies Hussein, L'Esperance, Guerder, Davies and Seppala, as in the rejection

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of claims 1 and 3 through 7, and further cites Kaufman as teaching optical fibers of less than 200 microns in diameter.

Our review of Kaufman reveals that the reference fails to supply the necessary teaching, suggestion or motivation found lacking in our discussion of the prior art applied against claims 1 and 3 through 7. Therefore, we will not sustain the rejection of claim 8 under 35 U.S.C. § 103 as being unpatentable over Hussein in view of L'Esperance, Guerder, Davies, Seppala and Kaufman.

Claims 2 and 9 are dependent on claims 1 and 8, respectively, and contain all of the limitations of their respective independent claim. Accordingly, the examiner's rejection of claims 2 and 9 under 35 U.S.C. § 103 will not be sustained.

CONCLUSION

To summarize, the decision of the examiner to reject claims 1 through 9 under 35 U.S.C. § 103 is reversed.

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REVERSED

NEAL E. ABRAMS)	
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)	BOARD OF PATENT
LAWRENCE J. STAAB)	APPEALS AND
Administrative Patent Judge)	INTERFERENCES
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VSH

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